

## PATENT COOPERATION TREATY

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents  
United States Patent and Trademark  
Office  
Box PCT  
Washington, D.C.20231  
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

<b>Date of mailing (day/month/year)</b> 11 April 2000 (11.04.00)	
<b>International application No.</b> PCT/IT99/00248	<b>Applicant's or agent's file reference</b> E-5927/99
<b>International filing date (day/month/year)</b> 28 July 1999 (28.07.99)	<b>Priority date (day/month/year)</b> 28 July 1998 (28.07.98)
<b>Applicant</b> ALEARDI, Massimo et al	

1. The designated Office is hereby notified of its election made:



in the demand filed with the International Preliminary Examining Authority on:

25 February 2000 (25.02.00)



in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

<b>The International Bureau of WIPO</b> 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	<b>Authorized officer</b> Jean-Marc Vivet Telephone No.: (41-22) 338.83.38
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# PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

## PCT

NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL SEARCH REPORT  
OR THE DECLARATION

(PCT Rule 44.1)

To:

STUDIO TORTA S.r.l.  
Attn. JORIO PAOLO  
Via Viotti, 9  
10121 TORINO  
ITALY

Date of mailing  
(day/month/year)

30/11/1999

Applicant's or agent's file reference

E-5927/99

**FOR FURTHER ACTION**

See paragraphs 1 and 4 below

International application No.

PCT/IT 99/ 00248

International filing date

(day/month/year)

28/07/1999

Applicant

MILLER EUROPE S.p.A. et al.

1. ☒ The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

**Filing of amendments and statement under Article 19:**

The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

**When?** The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

**Where?** Directly to the International Bureau of WIPO  
34, chemin des Colombettes  
1211 Geneva 20, Switzerland  
Facsimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Further action(s):** The applicant is reminded of the following:

Shortly after **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

Within **19 months** from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within **20 months** from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the International Searching Authority



European Patent Office, P.B. 5818 Patentlaan 2  
NL-2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Sandra Van der Meer

## NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively.

### INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

#### What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

#### When?

Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

#### Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

#### How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

#### What documents must/may accompany the amendments?

##### Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

## OTES TO FORM PCT/ISA/220 (c ntinued)

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

- (i) the claim is unchanged;
- (ii) the claim is cancelled;
- (iii) the claim is new;
- (iv) the claim replaces one or more claims as filed;
- (v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:  
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."
2. [Where originally there were 15 claims and after amendment of all claims there are 11]:  
"Claims 1 to 15 replaced by amended claims 1 to 11."
3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:  
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or  
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."
4. [Where various kinds of amendments are made]:  
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

### "Statement under article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

**It must be in the language in which the international application is to be published.**

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

### Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

### Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>E-5927/99</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/IT 99/ 00248</b>	International filing date (day/month/year) <b>28/07/1999</b>	(Earliest) Priority Date (day/month/year) <b>28/07/1998</b>
Applicant  <b>MILLER EUROPE S.p.A. et al.</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the report**

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

3  
☐ None of the figures.

## INTERNATIONAL SEARCH REPORT

National Application No

PCT/IT 99/00248

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H01R12/36

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H01R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 177 955 A (PATRA PATENT TREUHAND) 16 April 1986 (1986-04-16)	1-3
Y	abstract; figures 1,2 ---	4-8
Y	US 5 494 456 A (CAPILUPO KATHLEEN A ET AL) 27 February 1996 (1996-02-27) column 3, line 37 - line 50; figure 3 ---	4
X	EP 0 829 924 A (THOMAS & BETTS CORP) 18 March 1998 (1998-03-18)	1
Y	page 2, column 1, line 53 -column 2, line 40; figure 1 ---	5-8
A	EP 0 452 061 A (MOLEX INC) 16 October 1991 (1991-10-16) page 5, column 5, line 67 -column 6, line 6; figure 7 -----	4

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&amp;" document member of the same patent family

Date of the actual completion of the international search

18 November 1999

Date of mailing of the international search report

30/11/1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Criqui, J-J

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

/IT 99/00248

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0177955	A	16-04-1986	DE 8430109 U JP 61096677 A	13-02-1986 15-05-1986
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US 5494456	A	27-02-1996	NONE	
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EP 0829924	A	18-03-1998	US 5931705 A CA 2214656 A JP 10125417 A	03-08-1999 11-03-1998 15-05-1999
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EP 0452061	A	16-10-1991	US 4978315 A DE 69120332 D DE 69120332 T ES 2088466 T JP 2649746 B JP 8031524 A KR 9700122 B	18-12-1990 25-07-1996 23-01-1997 16-08-1996 03-09-1997 02-02-1996 04-01-1997
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## PATENT COOPERATION TREATY

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## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

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National Application No

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IPC 7 H01R12/36

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"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Criqui, J-J

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Information on patent family members

International Application No

/IT 99/00248

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			JP 61096677 A	15-05-1986
US 5494456	A	27-02-1996	NONE	
EP 0829924	A	18-03-1998	US 5931705 A	03-08-1999
			CA 2214656 A	11-03-1998
			JP 10125417 A	15-05-1999
EP 0452061	A	16-10-1991	US 4978315 A	18-12-1990
			DE 69120332 D	25-07-1996
			DE 69120332 T	23-01-1997
			ES 2088466 T	16-08-1996
			JP 2649746 B	03-09-1997
			JP 8031524 A	02-02-1996
			KR 9700122 B	04-01-1997

REPLACED  
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WO 00/07263

PCT/IT99/00248

- 1 -

JC07 Rec'd PCT/PTO 29 JAN 200

5

BOARD-MOUNTED ELECTRONIC DEVICE, IN PARTICULAR AN  
ELECTRONIC GAS LIGHTER, INCLUDING MEANS FOR FAST  
CONNECTION OF INSULATED ELECTRIC WIRES TO AN ELECTRIC  
10 CIRCUIT ON THE BOARD

#### TECHNICAL FIELD

The present invention relates to a board-mounted  
electronic device including means for fast electric  
15 connection of insulated electric wires to an electric  
circuit on the board. Such a device is particularly  
useful for producing electronic gas-lighting devices for  
gas cookers.

#### BACKGROUND ART

20 In currently used electric/electronic devices,  
various methods are employed for electrically connecting  
one or more conducting wires to a circuit printed (or  
carried) on a board: the most common consists in  
soldering the conducting wires to points or seats formed  
25 on the printed circuit; another consists in providing  
the circuit with terminals (normally applied and/or  
soldered to the board) which are either pressed directly

onto the conducting wires, or are designed to receive corresponding male or female connectors fitted beforehand to the wires.

Such connecting systems are obviously slow, complicated, and therefore expensive and difficult to incorporate in automated assembly procedures.

#### DISCLOSURE OF INVENTION

It is an object of the present invention to provide an electronic device enabling electric connection of one or more insulated wires to an electric circuit on the device without incurring the aforementioned drawbacks, and which at the same time is compact and inexpensive.

According to the present invention, there is provided a board-mounted electronic device, in particular a gas-lighting device for gas cookers, comprising : a board for supporting electronic components and supporting an electric circuit for mutual connection of said electronic components; and at least one terminal for electrically connecting said circuit and a respective insulated electric wire comprising an inner conductor with an insulating sheath coated and/or applied to the inner conductor; characterized in that said terminal comprises a metal blade forming part of said circuit and carried integrally by the board; said blade projecting from a first face of the board; and said blade being so formed as to define means for mechanically retaining and electrically connecting said

electric wire, and which act on an end portion of said inner conductor.

The terminals may thus be formed integrally with the circuit and the supporting board, which form a single whole, e.g. by being formed by co-molding the board in synthetic plastic resin with respective tracks of the electric circuit defined by semicut metal strips; and the electric wires to be connected - which may be external wires for connecting the device to the power supply or to a user device, or wires for electrically connecting one or more electronic components on the device to the board-mounted electric circuit - are connected with no soldering or wire terminations required.

15        BRIEF DESCRIPTION OF DRAWINGS

Two preferred, non-limiting embodiments of the present invention will be described purely by way of example with reference to the accompanying drawings, in which:

20        Figure 1 shows an overall view in perspective of a first embodiment of the device according to the invention;

Figure 2 shows a top plan view of a portion of the Figure 1 device;

25        Figure 3 shows a rear cross section of a second embodiment of the device according to the invention;

Figures 4 and 5 show a rear and side view

## CLAIMS

1) A board-mounted electronic device, in particular a gas-lighting device for gas cookers, comprising : a  
5 board for supporting electronic components and supporting an electric circuit for mutual connection of said electronic components; and at least one terminal for electrically connecting said circuit and a respective insulated electric wire comprising an inner  
10 conductor with an insulating sheath coated and/or applied to the inner conductor; characterized in that said terminal comprises a metal blade forming part of said circuit and carried integrally by the board; said blade projecting from a first face of the board; and  
15 said blade being so formed as to define means for mechanically retaining and electrically connecting said electric wire, and which act on an end portion of said inner conductor.

2) A device as claimed in Claim 1, characterized in  
20 that said blade comprises a respective slot having cutting edges for cutting said insulating sheath; the slot comprising a respective semicircular seat of a diameter substantially equal to that of said inner conductor of the electric wire and in any case smaller  
25 than the diameter of the insulating sheath; said slot receiving one end of said electric wire to cut said insulating sheath to such a depth as to establish

contact between said blade and said inner conductor of the electric wire, while at the same time forming a joint to mechanically retain the electric wire inside said seat.

5        3) A device as claimed in Claim 2, characterized in that said slot is substantially in the form of a V-shaped groove for assisting insertion of said end of said electric wire inside said seat, which is formed at the vertex of the V defining said groove.

10       4) A device as claimed in Claim 1, characterized in that said blade comprises a first and a second tab extending, at least partially, substantially facing each other; at least said first tab being bent towards said second tab, so that an edge of the first tab contacts a  
15 surface of said second tab; said first tab being elastically deformable to permit insertion of said end of said electric wire between said first and second tabs.

5) A device as claimed in any one of the foregoing  
20 Claims, characterized in that said blade is in the form of an integral extension of a track of said circuit, and is bent into an L outwards of the plane of the board.

6) A device as claimed in Claim 5, characterized in that said circuit comprises a number of tracks, each  
25 defined by a semicut metal strip applied to said board.

7) A device as claimed in Claim 6, characterized in that said board is molded from synthetic plastic resin;

said strips being co-molded with the board.

8) A device as claimed in Claim 4, characterized in that said blade is fitted integrally to said board, and is connected electrically and mechanically to a track of  
5 said circuit.



PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification<sup>7</sup>:  
H01R 12/36

A1

(11) International Publication Number: WO 00/07263

(43) International Publication Date: 10 February 2000 (10.02.00)

(21) International Application Number: PCT/IT99/00248

(22) International Filing Date: 28 July 1999 (28.07.99)

(30) Priority Data:  
TO98U000144 28 July 1998 (28.07.98) IT

(71) Applicant (for all designated States except US): MILLER  
EUROPE S.p.A. [IT/IT]; Via Privata Iseo, 6 E, I-20098 S.  
Giuliano Milanese (IT).

(72) Inventors; and

(75) Inventors/Applicants (for US only): ALEARDI, Massimo  
[IT/IT]; Via A. Costa, 36, I-21012 Cassano Magnago (IT).  
BIANCHI, Raoul [IT/IT]; Via Monte Grappa, 51, I-22079  
Villa Guardia (IT).

(74) Agents: JORIO, Paolo et al.; Studio Torta S.r.l., Via Viotti, 9,  
I-10121 Torino (IT).

(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG,  
BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB,  
GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG,  
KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK,  
MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI,  
SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA,  
ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ,  
UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD,  
RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK,  
ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI  
patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR,  
NE, SN, TD, TG).

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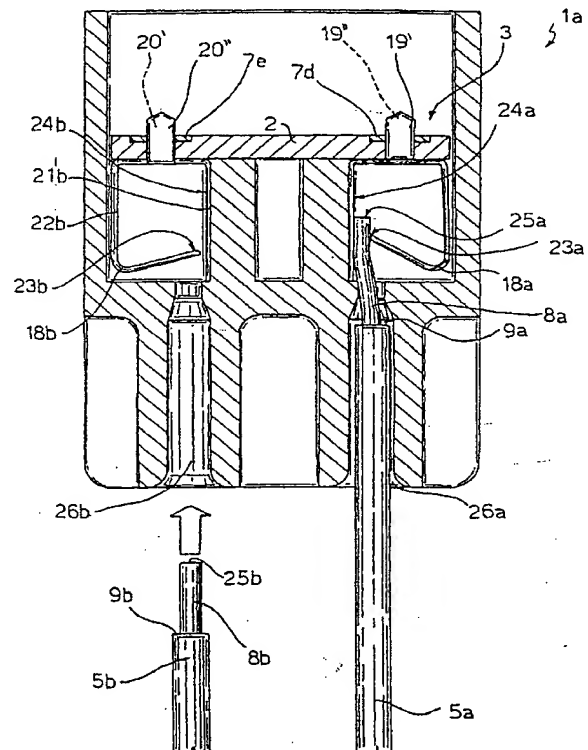
With international search report.

Before the expiration of the time limit for amending the  
claims and to be republished in the event of the receipt of  
amendments.

(54) Title: BOARD-MOUNTED ELECTRONIC DEVICE, IN PARTICULAR AN ELECTRONIC GAS LIGHTER, INCLUDING  
MEANS FOR FAST CONNECTION OF INSULATED ELECTRIC WIRES TO AN ELECTRIC CIRCUIT ON THE BOARD

(57) Abstract

A device including: a board for supporting electronic components and supporting an electric circuit for mutual connection of the electronic components; and at least one terminal for electrically connecting the circuit and a respective insulated electric wire having an inner conductor covered with a coated and/or applied insulating sheath; the terminal being defined by a metal blade forming part of the circuit and which is carried integrally by the board and projects from a first face of the board. The blade is so formed as to define means for mechanically retaining and electrically connecting the electric wire, and which act on an end portion of the inner conductor.



## INTERNATIONAL SEARCH REPORT

International Application No.

PCT/IT 99/00248

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 H01R12/36

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H01R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 177 955 A (PATRA PATENT TREUHAND) 16 April 1986 (1986-04-16)	1-3
Y	abstract; figures 1,2	4-8
Y	US 5 494 456 A (CAPILUPO KATHLEEN A ET AL) 27 February 1996 (1996-02-27) column 3, line 37 - line 50; figure 3	4
X	EP 0 829 924 A (THOMAS & BETTS CORP) 18 March 1998 (1998-03-18)	1
Y	page 2, column 1, line 53 -column 2, line 40; figure 1	5-8
A	EP 0 452 061 A (MOLEX INC) 16 October 1991 (1991-10-16) page 5, column 5, line 67 -column 6, line 6; figure 7	4

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&amp;" document member of the same patent family

Date of the actual completion of the international search

18 November 1999

Date of mailing of the international search report

30/11/1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3018

Authorized officer

Criqui, J-J

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IT 99/00248

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0177955	A	16-04-1986	DE 8430109 U JP 61096677 A	13-02-1986 15-05-1986
US 5494456	A	27-02-1996	NONE	
EP 0829924	A	18-03-1998	US 5931705 A CA 2214656 A JP 10125417 A	03-08-1999 11-03-1998 15-05-1999
EP 0452061	A	16-10-1991	US 4978315 A DE 69120332 D DE 69120332 T ES 2088466 T JP 2649746 B JP 8031524 A KR 9700122 B	18-12-1990 25-07-1996 23-01-1997 16-08-1996 03-09-1997 02-02-1996 04-01-1997

PCT

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference E-5927/99		See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) <b>FOR FURTHER ACTION</b>	
International application No. PCT/IT99/00248	International filing date (day/month/year) 28/07/1999	Priority date (day/month/year) 28/07/1998	
International Patent Classification (IPC) or national classification and IPC H01R12/36			
Applicant MILLER EUROPE S.p.A. et al.			

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.


2. This REPORT consists of a total of 8 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 5 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☒ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand  25/02/2000	Date of completion of this report  25.10.2000
Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer  Arenz, R  Telephone No. +49 89 2399 8177



**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/IT99/00248

**I. Basis of the report**

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.)*:

**Description, pages:**

4-8	as originally filed		
1-3	as received on	18/07/2000 with letter of	20/06/2000

**Claims, No.:**

1-5	as received on	18/07/2000 with letter of	20/06/2000
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**Drawings, sheets:**

1/3-3/3	as originally filed
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2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

**III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

- ☐ the entire international application.  
☒ claims Nos. 4.

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/IT99/00248

because:

- ☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):
  
- ☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 4 are so unclear that no meaningful opinion could be formed (*specify*):  
  
**see separate sheet**
- ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
- ☐ no international search report has been established for the said claims Nos. .

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. Statement

Novelty (N)	Yes:	Claims	1-3,5
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-3,5
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-3,5
	No:	Claims	

### 2. Citations and explanations

**see separate sheet**

# **INTERNATIONAL PRELIMINARY EXAMINATION REPORT**

International application No. PCT/IT99/00248

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## **VI. Certain documents cited**

1. Certain published documents (Rule 70.10)

and / or

2. Non-written disclosures (Rule 70.9)

**see separate sheet**

## **VII. Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:

**see separate sheet**

## **VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

**Re Item III**

**Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

1. As stated in Section VIII (Point 2) claim 4 does not satisfy the criteria of clarity set out in Article 6 PCT and cannot be understood, hence no opinion has been established with regard to novelty, inventive step and industrial applicability upon claim 4.

**Re Item V**

**Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Reference is made to the following documents:

D1: EP-A-0 177 955 (PATRA PATENT TREUHAND) 16 April 1986 (1986-04-16)

D2: EP-A-0 727 851 (SUMITOMO WIRING SYSTEMS) 21 August 1996 (1996-08-21)

The document D2 was not cited in the international search report. A copy of this document is appended.

2. Novelty

**D1**, which is considered to represent the most relevant state of the art, discloses a board-mounted electronic device (cf. fig. 1, page 1, lines 1-14) from which the subject-matter of claim 1 differs in that the terminal of the board-mounted device comprises "... a metal blade formed in one piece with said track of said circuit, bent into an L outwards of a plane of the board...".

Thus, the subject-matter of main claim 1 satisfies the requirement of novelty (Article 33(2) PCT).



3. Inventive step

D1 is considered to represent the most relevant state of the art, the subject-matter of claim 1 differs in that the board-mounted device comprises "... a metal blade formed in one piece with said track of said circuit, bent into an L outwards of a plane of the board...".

The objective problem to be solved by the present invention is therefore regarded as to provide an electronic device enabling electrical connection of one or more insulated wires which is **compact** (cf. page 2, lines 8-12).

Although document D2(=EP-A-0 727 851) discloses (cf. fig. 11,13) a terminal for a board-mounted device comprising a metal blade (tab 22a, contact pressing slit 22b) formed in one piece with the track (bus bar 22) of the circuit, bent into an L outwards of a plane of the board and carried integrally by the board the skilled person in the art would not consider to utilise these features within a board-mounted electronic device according to D1.

D2 discloses that a distal end portion of a tab (23) is inserted in the contact pressing slit (22b) of said metal blade (22). D2 gives no indication to connect the metal blade, in particular the contact pressing slit 22b, with one or more insulated wires enabling electric connection to an electric circuit.

Further, the skilled person would not consider D2, because the purpose of D2, relating to a connection between an electrical connection box and an electronic circuit unit (cf. D2, col. 1, lines 5-14), is not similar to the purpose of the claimed invention.

Therefore, the subject-matter of claim 1 involves an inventive step (Article 33(3) PCT).

4. Claims 2,3,5 are dependent on claim 1 and as such also meet the requirements of Articles 33(2) and 33(3) PCT.
5. The invention as claimed in claims 1-3,5 is industrially applicable (Article 33(4) PCT).

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/IT99/00248

**Re Item VI**

**Certain documents cited**

1. The document D2(= EP-A-0 727 851) has not been cited in the international search report. A copy of this document is appended.

**Re Item VII**

**Certain defects in the international application**

1. The reference in claim 4 to claim 5 is incorrect.
2. Although claim 1 is drafted in the two-part form the features according to which the "...blade being so formed as to define means for mechanically retaining and electrically connecting said electric wire and which act on an end portion of said inner conductor..." are incorrectly placed in the characterising portion, as they are known from D1 in combination with the features placed in the preamble (Rule 6.3(b) PCT).
3. Contrary to the requirements of Rule 5.1(a)(ii) PCT the relevant background art disclosed in D1 is not mentioned in the description.
4. Owing to the limitation of the claims, parts of the description ( cf. page 6, line 20 to the end of page 8) and the figures 3,4,5 do not relate to subject-matter of the claims anymore.  
On page 3, lines 20-24 of the description "... embodiments of the device according to the invention..." are referred to figures 1 and 2, but none of these figures shows a metal blade formed in one piece with the track.

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/IT99/00248

**Re Item VIII**

**Certain observations on the international application**

1. The term "...semicut metal strip..." used in claim 4 remain unclear and leaves the reader in doubt as to the meaning of the technical features to which it refers, thereby rendering the definition of the subject-matter of said claim unclear (Article 6 PCT).

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- 1 -

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BOARD-MOUNTED ELECTRONIC DEVICE, IN PARTICULAR AN  
ELECTRONIC GAS LIGHTER, INCLUDING MEANS FOR FAST  
CONNECTION OF INSULATED ELECTRIC WIRES TO AN ELECTRIC  
10 CIRCUIT ON THE BOARD

#### TECHNICAL FIELD

The present invention relates to a board-mounted  
electronic device including means for fast electric  
15 connection of insulated electric wires to an electric  
circuit on the board. Such a device is particularly  
useful for producing electronic gas-lighting devices for  
gas cookers.

#### BACKGROUND ART

20 In currently used electric/electronic devices,  
various methods are employed for electrically connecting  
one or more conducting wires to a circuit printed (or  
(as shown in EP-A-0177955, US-A-5494456 and EP-A-0727851,  
carried) on a board; the most common consists in  
soldering the conducting wires to points or seats formed  
25 on the printed circuit; another consists in providing  
the circuit with terminals (normally applied and/or  
soldered to the board) which are either pressed directly

AMENDED SHEET

M 18.0.00

- 2 -

onto the conducting wires, or are designed to receive corresponding male or female connectors fitted beforehand to the wires.

Such connecting systems are obviously slow, complicated, and therefore expensive and difficult to incorporate in automated assembly procedures.

#### DISCLOSURE OF INVENTION

It is an object of the present invention to provide an electronic device enabling electric connection of one or more insulated wires to an electric circuit on the device without incurring the aforementioned drawbacks, and which at the same time is compact and inexpensive.

According to the present invention, there is provided a board-mounted electronic device, in particular a gas-lighting device for gas cookers, as claimed in claim 1.

~~comprising : a board for supporting electronic components and supporting an electric circuit for mutual connection of said electronic components; and at least one terminal for electrically connecting said circuit and a respective insulated electric wire comprising an inner conductor with an insulating sheath coated and/or applied to the inner conductor; characterized in that said terminal comprises a metal blade forming part of said circuit and carried integrally by the board; said blade projecting from a first face of the board; and said blade being so formed as to define means for mechanically retaining and electrically connecting said~~

M 18.01.00

- 3 -

~~electric wire, and which act on an end portion of said inner conductor.~~

The terminals may thus be formed integrally with the circuit and the supporting board, which form a single whole, e.g. by being formed by co-molding the board in synthetic plastic resin with respective tracks of the electric circuit defined by semicut metal strips; and the electric wires to be connected - which may be external wires for connecting the device to the power supply or to a user device, or wires for electrically connecting one or more electronic components on the device to the board-mounted electric circuit - are connected with no soldering or wire terminations required.

15      BRIEF DESCRIPTION OF DRAWINGS

Two preferred, non-limiting embodiments of the present invention will be described purely by way of example with reference to the accompanying drawings, in which:

20      Figure 1 shows an overall view in perspective of a first embodiment of the device according to the invention;

Figure 2 shows a top plan view of a portion of the Figure 1 device;

25      Figure 3 shows a rear cross section of a second embodiment of the device according to the invention;

Figures 4 and 5 show a rear and side view

M 13.01.00

## CLAIMS

1) A board-mounted electronic device, in particular a gas-lighting device for gas cookers, comprising:

5 a board (2) for supporting electronic components and supporting at least one conductive track (7a, 7b) for mutual connection of said electronic components, to form an electric circuit (3);

and at least one terminal (4a, 4b) for electrically  
10 connecting said circuit (3) and a respective insulated electric wire (5a, 5b) comprising an inner conductor (8a, 8b) with an insulating sheath (9a, 9b) coated and/or applied to the inner conductor (8a, 8b);

characterized in that said terminal (4a, 4b) comprises  
15 a metal blade (10a, 10b) formed in one piece with said track (7a, 7b) of said circuit (3), bent into an L outwards of the plane of the board (2) and carried integrally by the board (2); said blade (10a, 10b) being so formed as to define means (11a, 11b) for mechanically retaining and  
20 electrically connecting said electric wire (5a, 5b), and which act on an end portion of said inner conductor (8a, 8b).

2) A device as claimed in Claim 1, characterized in that said blade (10a, 10b) comprises a respective slot  
25 (11a, 11b) having cutting edges (13', 13'', 13', 14'') for cutting said insulating sheath (9a, 9b); the slot (11a, 11b) comprising a respective semicircular seat (12a, 12b) of a diameter substantially equal to that of said inner

M 15 00 00  
10

conductor (8a, 8b) of the electric wire (5a, 5b) and in any case smaller than the diameter of the insulating sheath (9a, 9b); said slot (11a, 11b) receiving one end of said electric wire (5a, 5b) to cut said insulating sheath (9a, 9b) to such a depth as to establish contact between said blade (10a, 10b) and said inner conductor (8a, 8b) of the electric wire (5a, 5b), while at the same time forming a joint to mechanically retain the electric wire (5a, 5b) inside said seat (12a, 12b).

3) A device as claimed in Claim 2, characterized in that said slot (11a, 11b) is substantially in the form of a V-shaped groove for assisting insertion of said end of said electric wire (5a, 5b) inside said seat (12a, 12b), which is formed at the vertex of the V defining said groove.

4) A device as claimed in Claim 5, characterized in that said circuit comprises a number of tracks (7a, 7b), each defined by a semicut metal strip applied to said board (2).

5) A device as claimed in Claim 4, characterized in that said board (2) is molded from synthetic plastic resin; said strips being co-molded with the board (2).



# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>E-5927/99</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/IT 99/ 00248</b>	International filing date (day/month/year) <b>28/07/1999</b>	(Earliest) Priority Date (day/month/year) <b>28/07/1998</b>
Applicant <b>MILLER EUROPE S.p.A. et al.</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

### 1. Basis of the report

a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of invention is lacking (see Box II).

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

3

☐ None of the figures.

## INTERNATIONAL SEARCH REPORT

International Application No.

CT/IT 99/00248

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 H01R12/36

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H01R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Y	page 2, column 1, line 53 -column 2, line 40; figure 1	5-8
A	EP 0 452 061 A (MOLEX INC) 16 October 1991 (1991-10-16) page 5, column 5, line 67 -column 6, line 6; figure 7	4

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

18 November 1999

Date of mailing of the international search report

30/11/1999

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3018

Authorized officer

Criqui, J-J

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IT 99/00248

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0177955	A	16-04-1986	DE 8430109 U JP 61096677 A	13-02-1986 15-05-1986
US 5494456	A	27-02-1996	NONE	
EP 0829924	A	18-03-1998	US 5931705 A CA 2214656 A JP 10125417 A	03-08-1999 11-03-1998 15-05-1999
EP 0452061	A	16-10-1991	US 4978315 A DE 69120332 D DE 69120332 T ES 2088466 T JP 2649746 B JP 8031524 A KR 9700122 B	18-12-1990 25-07-1996 23-01-1997 16-08-1996 03-09-1997 02-02-1996 04-01-1997

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

JORIO PAOLO  
STUDIO TORTA S.r.l.  
Via Viotti, 9  
10121 TORINO  
ITALIE

## PCT

NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT  
(PCT Rule 71.1)

Date of mailing (day/month/year)	25.10.2000
-------------------------------------	------------

Applicant's or agent's file reference E-5927/99	<b>IMPORTANT NOTIFICATION</b>
--	-------------------------------

International application No. PCT/IT99/00248	International filing date (day/month/year) 28/07/1999	Priority date (day/month/year) 28/07/1998
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Applicant MILLER EUROPE S.p.A. et al.
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1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/	Authorized officer
---------------------------------------	--------------------



European Patent Office  
D-80298 Munich  
Tel. +49 89 2399 - 0 Tx: 523656 epmu d  
Fax: +49 89 2399 - 4465

Loeper, S

Tel. +49 89 2399-2569



# ATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT



(PCT Article 36 and Rule 70)

Applicant's or agent's file reference E-5927/99		<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/IT99/00248	International filing date (day/month/year) 28/07/1999	Priority date (day/month/year) 28/07/1998	
International Patent Classification (IPC) or national classification and IPC H01R12/36			
Applicant MILLER EUROPE S.p.A. et al.			

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 8 sheets, including this cover sheet.
  - ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 5 sheets.

3. This report contains indications relating to the following items:
  - I ☒ Basis of the report
  - II ☐ Priority
  - III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
  - IV ☐ Lack of unity of invention
  - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
  - VI ☒ Certain documents cited
  - VII ☒ Certain defects in the international application
  - VIII ☒ Certain observations on the international application

Date of submission of the demand  25/02/2000	Date of completion of this report  25.10.2000
Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer  Arenz, R  Telephone No. +49 89 2399 8177  

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/IT99/00248

## I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

### Description, pages:

4-8 as originally filed

1-3 as received on 18/07/2000 with letter of 20/06/2000

### Claims, No.:

1-5 as received on 18/07/2000 with letter of 20/06/2000

### Drawings, sheets:

1/3-3/3 as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

## III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

- ☐ the entire international application.
- ☒ claims Nos. 4.

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/IT99/00248

because:

- ☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):
  
- ☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 4 are so unclear that no meaningful opinion could be formed (*specify*):  
  
**see separate sheet**
  
- ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
  
- ☐ no international search report has been established for the said claims Nos. .

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. Statement

Novelty (N)	Yes:	Claims	1-3,5
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-3,5
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-3,5
	No:	Claims	

### 2. Citations and explanations

**see separate sheet**

# **INTERNATIONAL PRELIMINARY EXAMINATION REPORT**

International application No. PCT/IT99/00248

## **VI. Certain documents cited**

1. Certain published documents (Rule 70.10)

and / or

2. Non-written disclosures (Rule 70.9)

**see separate sheet**

## **VII. Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:

**see separate sheet**

## **VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**



**Re Item III**

**Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

1. As stated in Section VIII (Point 2) claim 4 does not satisfy the criteria of clarity set out in Article 6 PCT and cannot be understood, hence no opinion has been established with regard to novelty, inventive step and industrial applicability upon claim 4.

**Re Item V**

**Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Reference is made to the following documents:

D1: EP-A-0 177 955 (PATRA PATENT TREUHAND) 16 April 1986 (1986-04-16)

D2: EP-A-0 727 851 (SUMITOMO WIRING SYSTEMS) 21 August 1996 (1996-08-21)

The document D2 was not cited in the international search report. A copy of this document is appended.

2. Novelty

**D1**, which is considered to represent the most relevant state of the art, discloses a board-mounted electronic device (cf. fig. 1, page 1, lines 1-14) from which the subject-matter of claim 1 differs in that the terminal of the board-mounted device comprises "... a metal blade formed in one piece with said track of said circuit, bent into an L outwards of a plane of the board...".

Thus, the subject-matter of main claim 1 satisfies the requirement of novelty (Article 33(2) PCT).

3. Inventive step

D1 is considered to represent the most relevant state of the art, the subject-matter of claim 1 differs in that the board-mounted device comprises "... a metal blade formed in one piece with said track of said circuit, bent into an L outwards of a plane of the board...".

The objective problem to be solved by the present invention is therefore regarded as to provide an electronic device enabling electrical connection of one or more insulated wires which is **compact** (cf. page 2, lines 8-12).

Although document D2(=EP-A-0 727 851) discloses (cf. fig. 11,13) a terminal for a board-mounted device comprising a metal blade (tab 22a, contact pressing slit 22b) formed in one piece with the track (bus bar 22) of the circuit, bent into an L outwards of a plane of the board and carried integrally by the board the skilled person in the art would not consider to utilise these features within a board-mounted electronic device according to D1.

D2 discloses that a distal end portion of a tab (23) is inserted in the contact pressing slit (22b) of said metal blade (22). D2 gives no indication to connect the metal blade, in particular the contact pressing slit 22b, with one or more insulated wires enabling electric connection to an electric circuit.

Further, the skilled person would not consider D2, because the purpose of D2, relating to a connection between an electrical connection box and an electronic circuit unit (cf. D2, col. 1, lines 5-14), is not similar to the purpose of the claimed invention.

Therefore, the subject-matter of claim 1 involves an inventive step (Article 33(3) PCT).

4. Claims 2,3,5 are dependent on claim 1 and as such also meet the requirements of Articles 33(2) and 33(3) PCT.
5. The invention as claimed in claims 1-3,5 is industrially applicable (Article 33(4) PCT).

**Re Item VI**

**Certain documents cited**

1. The document D2(= EP-A-0 727 851) has not been cited in the international search report. A copy of this document is appended.

**Re Item VII**

**Certain defects in the international application**

1. The reference in claim 4 to claim 5 is incorrect.
2. Although claim 1 is drafted in the two-part form the features according to which the "...blade being so formed as to define means for mechanically retaining and electrically connecting said electric wire and which act on an end portion of said inner conductor..." are incorrectly placed in the characterising portion, as they are known from D1 in combination with the features placed in the preamble (Rule 6.3(b) PCT).
3. Contrary to the requirements of Rule 5.1(a)(ii) PCT the relevant background art disclosed in D1 is not mentioned in the description.
4. Owing to the limitation of the claims, parts of the description ( cf. page 6, line 20 to the end of page 8) and the figures 3,4,5 do not relate to subject-matter of the claims anymore.  
On page 3, lines 20-24 of the description "... embodiments of the device according to the invention..." are referred to figures 1 and 2, but none of these figures shows a metal blade formed in one piece with the track.

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/IT99/00248

**Re Item VIII**

**Certain observations on the international application**

1. The term "...semicut metal strip..." used in claim 4 remain unclear and leaves the reader in doubt as to the meaning of the technical features to which it refers, thereby rendering the definition of the subject-matter of said claim unclear (Article 6 PCT).



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5

BOARD-MOUNTED ELECTRONIC DEVICE, IN PARTICULAR AN  
ELECTRONIC GAS LIGHTER, INCLUDING MEANS FOR FAST  
CONNECTION OF INSULATED ELECTRIC WIRES TO AN ELECTRIC  
10 CIRCUIT ON THE BOARD

#### TECHNICAL FIELD

The present invention relates to a board-mounted  
electronic device including means for fast electric  
15 connection of insulated electric wires to an electric  
circuit on the board. Such a device is particularly  
useful for producing electronic gas-lighting devices for  
gas cookers.

#### BACKGROUND ART

20 In currently used electric/electronic devices,  
various methods are employed for electrically connecting  
one or more conducting wires to a circuit printed (or  
carried) on a board: the most common consists in  
soldering the conducting wires to points or seats formed  
25 on the printed circuit; another consists in providing  
the circuit with terminals (normally applied and/or  
soldered to the board) which are either pressed directly

onto the conducting wires, or are designed to receive corresponding male or female connectors fitted beforehand to the wires.

Such connecting systems are obviously slow, complicated, and therefore expensive and difficult to incorporate in automated assembly procedures.

#### DISCLOSURE OF INVENTION

It is an object of the present invention to provide an electronic device enabling electric connection of one or more insulated wires to an electric circuit on the device without incurring the aforementioned drawbacks, and which at the same time is compact and inexpensive.

According to the present invention, there is provided a board-mounted electronic device, in particular a gas-lighting device for gas cookers, comprising : a board for supporting electronic components and supporting an electric circuit for mutual connection of said electronic components; and at least one terminal for electrically connecting said circuit and a respective insulated electric wire comprising an inner conductor with an insulating sheath coated and/or applied to the inner conductor; characterized in that said terminal comprises a metal blade forming part of said circuit and carried integrally by the board; said blade projecting from a first face of the board; and said blade being so formed as to define means for mechanically retaining and electrically connecting said



electric wire, and which act on an end portion of said inner conductor.

The terminals may thus be formed integrally with the circuit and the supporting board, which form a single whole, e.g. by being formed by co-molding the board in synthetic plastic resin with respective tracks of the electric circuit defined by semicut metal strips; and the electric wires to be connected - which may be external wires for connecting the device to the power supply or to a user device, or wires for electrically connecting one or more electronic components on the device to the board-mounted electric circuit - are connected with no soldering or wire terminations required.

BRIEF DESCRIPTION OF DRAWINGS

Two preferred, non-limiting embodiments of the present invention will be described purely by way of example with reference to the accompanying drawings, in which:

Figure 1 shows an overall view in perspective of a first embodiment of the device according to the invention;

Figure 2 shows a top plan view of a portion of the Figure 1 device;

Figure 3 shows a rear cross section of a second embodiment of the device according to the invention;

Figures 4 and 5 show a rear and side view

respectively of a detail of the Figure 3 device.

BEST MODE FOR CARRYING OUT THE INVENTION

With reference to Figures 1 and 2, number 1 indicates as a whole an electronic device in accordance  
5 with the teachings of the present invention.

Device 1 - in the example, a known gas-lighting device not described in detail (and shown only partly in Figure 1 for the sake of simplicity) - comprises a supporting board 2; an electric circuit 3 carried by  
10 board 2 (only part of board 2 and electric circuit 3 is shown for the sake of simplicity); a pair of connecting terminals 4a and 4b connected to respective tracks of electric circuit 3; and a corresponding pair of insulated electric wires 5a and 5b.

15 Supporting board 2 is molded from synthetic plastic resin and has a face 6 for supporting electronic components.

Electric circuit 3 is known, and comprises a number of tracks (only tracks 7a, 7b, 7c shown partly, for the  
20 sake of simplicity) each defined by a semicut metal strip co-molded with supporting board 2.

Insulated electric wires 5a, 5b comprise respective inner conductors 8a, 8b of substantially circular cross section and covered with respective insulating sheaths  
25 9a, 9b coated and/or applied to inner conductors 8a, 8b.

Each sheath 9a, 9b therefore has a cross section in the form of an annulus with an inside diameter equal to

the diameter of the respective inner conductor.

Terminals 4a, 4b are defined by respective conducting blades 10a, 10b forming part of electric circuit 3 and which project from face 6 of board 2 and  
5 are carried integrally by board 2.

Conducting blades 10a, 10b are in the form of integral extensions of respective tracks 7a, 7b of electric circuit 3, and are each bent into an L outwards of the plane of board 2.

10 Each blade 10a, 10b comprises, at a longitudinal end, a respective slot 11a, 11b in the form of a V-shaped groove for assisting insertion of insulated electric wire 5a, 5b inside a respective semicircular seat 12a, 12b, which houses electric wire 5a, 5b, is of  
15 a diameter substantially equal to the diameter of inner conductor 8a, 8b, and is formed at the vertex of the V-shaped groove defining slot 11a, 11b.

Slots 11a and 11b have respective cutting edges 13', 13" (slot 11a) and 14', 14" (slot 11b) for making  
20 respective incisions 15', 15" and 16', 16" on opposite sides of respective sheaths 9a and 9b when respective electric wires 5a and 5b are inserted inside respective seats 12a and 12b.

Since the diameter of seats 12a and 12b is smaller  
25 than the outside diameter of sheaths 9a and 9b and substantially equal to the diameter of inner conductors 8a and 8b, incisions 15', 15", 16', 16" are radially

through incisions.

Inner conductors 8a and 8b, at least at one point, therefore contact conducting blades 10a and 10b to form respective electric connections with electric circuit 3 via the conducting blades.

Moreover, each incision 15', 15", 16', 16" extends circumferentially along an arc of less than 180°, so that the continuity of sheaths 9a and 9b is maintained along respective portions 17a and 17b.

In actual use, by means of incisions 15', 15", 16', 16" and integral portions 17a and 17b, sheaths 9a and 9b cooperate mechanically with respective edges of seats 12a and 12b to retain the ends of electric wires 5a and 5b and so prevent the wires from sliding longitudinally.

Inner conductors 8a and 8b are therefore connected electrically to electric circuit 3 by contacting blades 10a and 10b as described above, and the ends of wires 5a and 5b are secured firmly to respective seats 12a and 12b.

Figures 3, 4 and 5 show a variation 1a of device 1 as described above, and in which, for the sake of simplicity, any similar or identical details are indicated using the same reference numbers.

The device in the second embodiment comprises supporting board 2; electric circuit 3; a pair of electric wires 5a, 5b; and a pair of conducting blades 18a, 18b for connecting electric wires 5a, 5b

electrically and mechanically to electric circuit 3.

Blades 18a and 18b are fitted integrally to supporting board 2 by means of respective stems 19', 19" (blade 18a) and 20', 20" (blade 18b), which also provide  
5 for establishing contact with respective tracks 7d and 7e of electric circuit 3.

Figures 4 and 5 show blade 18a; blade 18b is identical and therefore not shown in detail.

Blade 18a comprises a first tab 21a and a second  
10 tab 22a, which are positioned at least partly facing each other.

Tab 22a is bent at an acute angle towards tab 21a, so that an edge 23a of tab 22a contacts a surface 24a of tab 21a.

15 Tab 22a is elastically deformable to permit insertion of wire 5a between tabs 21a and 22a.

Similarly, blade 18b comprises a tab 21b, a tab 22b bent at an acute angle, an edge 23b, and a surface 24b.

With reference to Figure 3, insulating sheaths 9a  
20 and 9b are removed from respective ends 25a and 25b of electric wires 5a and 5b to enable inner conductor 8a to contact tabs 21a and 22a of blade 18a, and inner conductor 8b to contact tabs 21b and 22b of blade 18b.

At assembly, electric wires 5a and 5b are inserted  
25 inside respective ducts 26a and 26b.

By virtue of the rigidity of inner conductors 8a and 8b, electric wires 5a and 5b deform respective tabs

22a and 22b, so that end 25a is inserted between edge 23a and surface 24a, and end 25b is inserted between edge 23b and surface 24b.

Blades 18a and 18b therefore provide for  
5 electrically connecting as well as mechanically retaining electric wires 5a and 5b.

Clearly, changes may be made to device 1 as described herein without, however, departing from the scope of the present invention.

## CLAIMS

1) A board-mounted electronic device, in particular a gas-lighting device for gas cookers, comprising : a  
5 board for supporting electronic components and supporting an electric circuit for mutual connection of said electronic components; and at least one terminal for electrically connecting said circuit and a  
10 respective insulated electric wire comprising an inner conductor with an insulating sheath coated and/or applied to the inner conductor; characterized in that said terminal comprises a metal blade forming part of said circuit and carried integrally by the board; said blade projecting from a first face of the board; and  
15 said blade being so formed as to define means for mechanically retaining and electrically connecting said electric wire, and which act on an end portion of said inner conductor.

2) A device as claimed in Claim 1, characterized in  
20 that said blade comprises a respective slot having cutting edges for cutting said insulating sheath; the slot comprising a respective semicircular seat of a diameter substantially equal to that of said inner conductor of the electric wire and in any case smaller  
25 than the diameter of the insulating sheath; said slot receiving one end of said electric wire to cut said insulating sheath to such a depth as to establish

contact between said blade and said inner conductor of the electric wire, while at the same time forming a joint to mechanically retain the electric wire inside said seat.

5           3) A device as claimed in Claim 2, characterized in that said slot is substantially in the form of a V-shaped groove for assisting insertion of said end of said electric wire inside said seat, which is formed at the vertex of the V defining said groove.

10           4) A device as claimed in Claim 1, characterized in that said blade comprises a first and a second tab extending, at least partially, substantially facing each other; at least said first tab being bent towards said second tab, so that an edge of the first tab contacts a  
15 surface of said second tab; said first tab being elastically deformable to permit insertion of said end of said electric wire between said first and second tabs.

          5) A device as claimed in any one of the foregoing  
20 Claims, characterized in that said blade is in the form of an integral extension of a track of said circuit, and is bent into an L outwards of the plane of the board.

          6) A device as claimed in Claim 5, characterized in that said circuit comprises a number of tracks, each  
25 defined by a semicut metal strip applied to said board.

          7) A device as claimed in Claim 6, characterized in that said board is molded from synthetic plastic resin;



said strips being co-molded with the board.

8) A device as claimed in Claim 4, characterized in that said blade is fitted integrally to said board, and is connected electrically and mechanically to a track of  
5 said circuit.

1 / 3

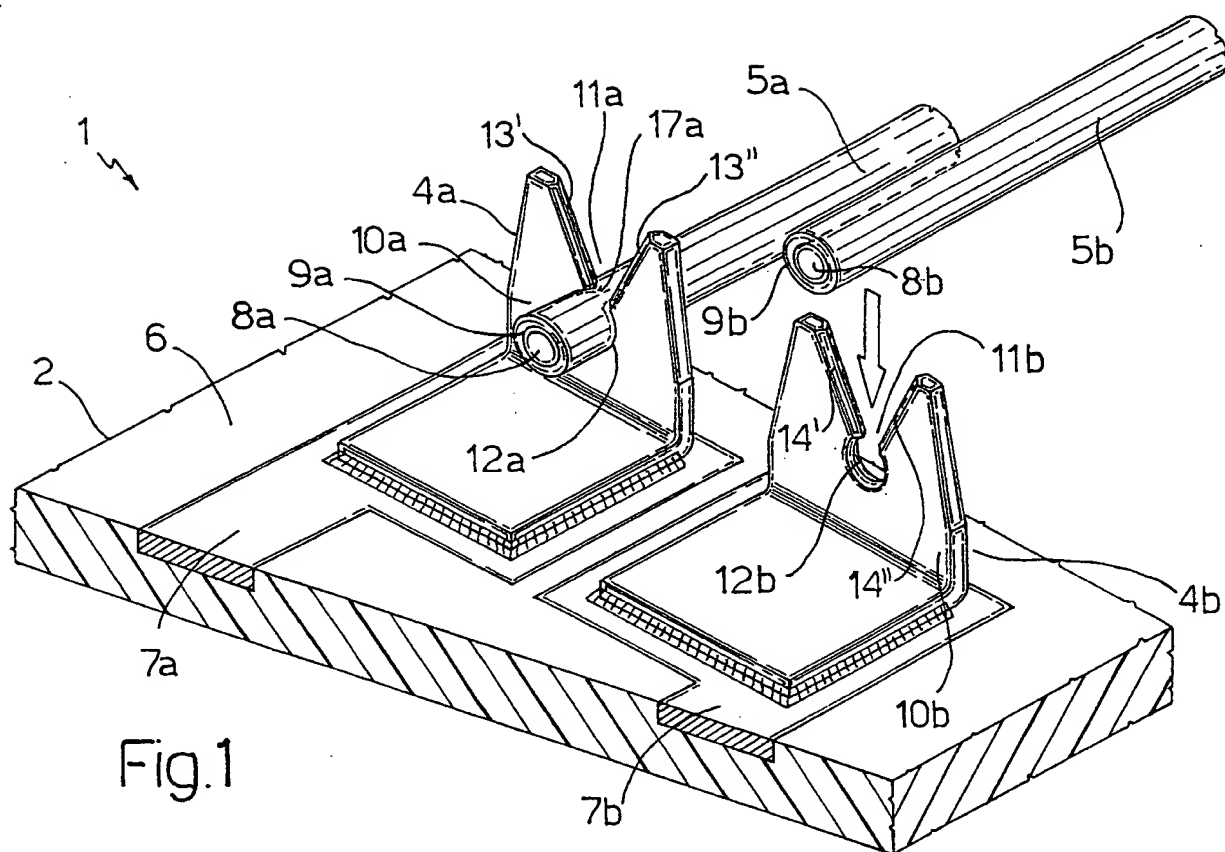


Fig.1

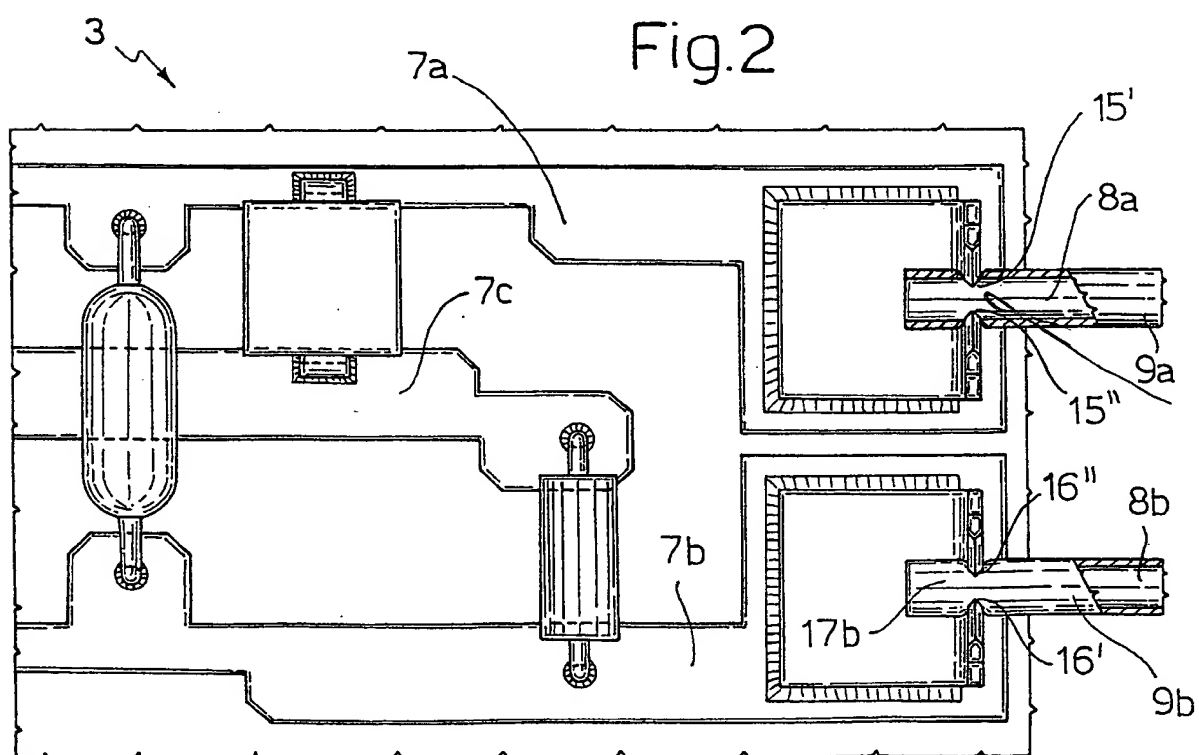


Fig.2

2 / 3

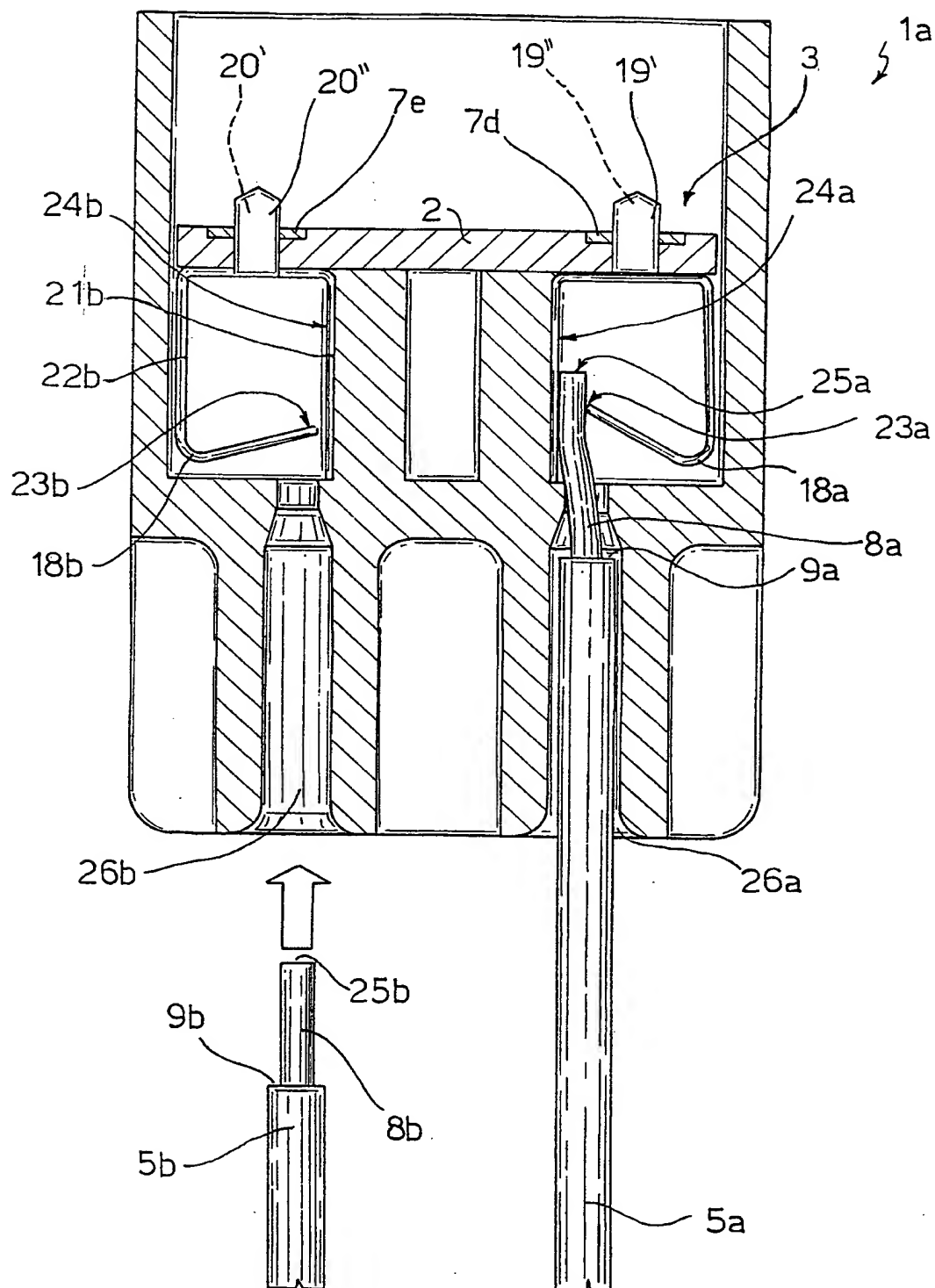
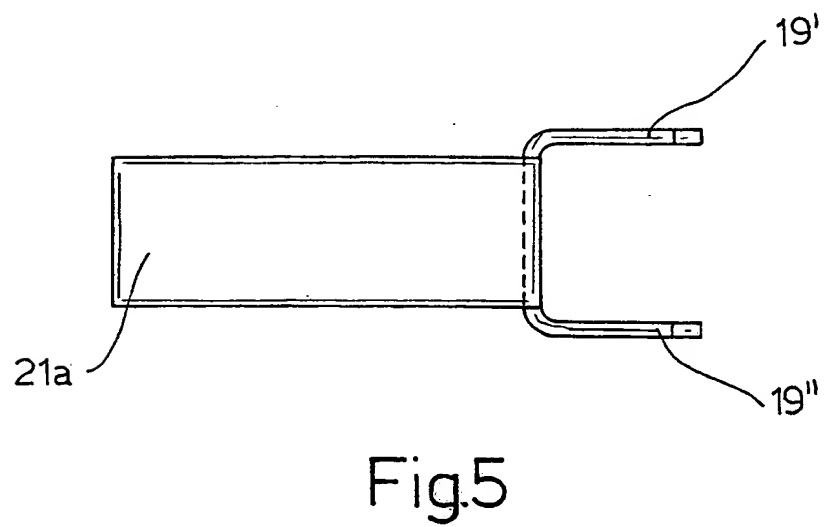
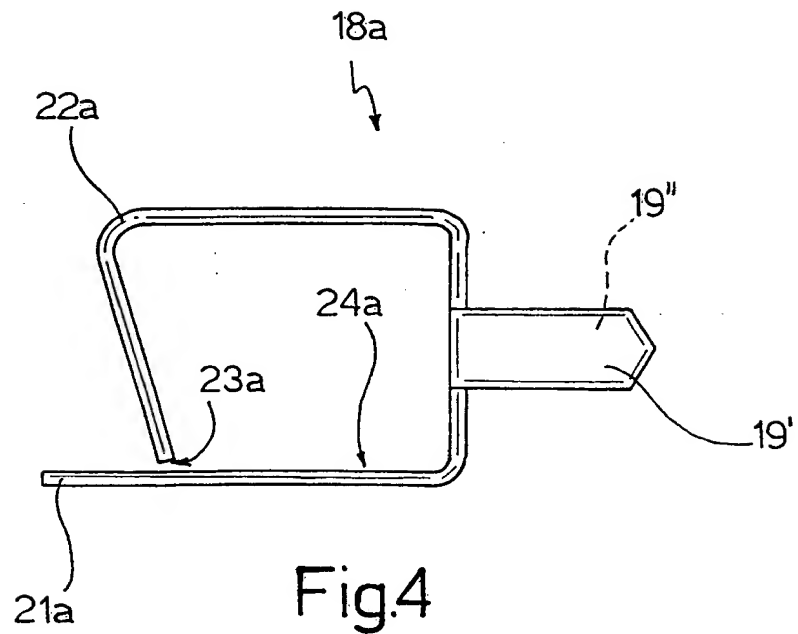


Fig.3

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## INTERNATIONAL SEARCH REPORT

 International Application No  
 PCT/IT 99/00248

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC 7 H01R12/36

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H01R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 177 955 A (PATRA PATENT TREUHAND) 16 April 1986 (1986-04-16)	1-3
Y	abstract; figures 1,2	4-8
Y	US 5 494 456 A (CAPILUPO KATHLEEN A ET AL) 27 February 1996 (1996-02-27) column 3, line 37 - line 50; figure 3	4
X	EP 0 829 924 A (THOMAS & BETTS CORP) 18 March 1998 (1998-03-18)	1
Y	page 2, column 1, line 53 -column 2, line 40; figure 1	5-8
A	EP 0 452 061 A (MOLEX INC) 16 October 1991 (1991-10-16) page 5, column 5, line 67 -column 6, line 6; figure 7	4

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

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"8" document member of the same patent family

Date of the actual completion of the international search

18 November 1999

Date of mailing of the international search report

30/11/1999

Name and mailing address of the ISA

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Authorized officer

Criqui, J-J

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IT 99/00248

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0177955	A	16-04-1986	DE 8430109 U JP 61096677 A	13-02-1986 15-05-1986
US 5494456	A	27-02-1996	NONE	
EP 0829924	A	18-03-1998	US 5931705 A CA 2214656 A JP 10125417 A	03-08-1999 11-03-1998 15-05-1999
EP 0452061	A	16-10-1991	US 4978315 A DE 69120332 D DE 69120332 T ES 2088466 T JP 2649746 B JP 8031524 A KR 9700122 B	18-12-1990 25-07-1996 23-01-1997 16-08-1996 03-09-1997 02-02-1996 04-01-1997